FIG. 1

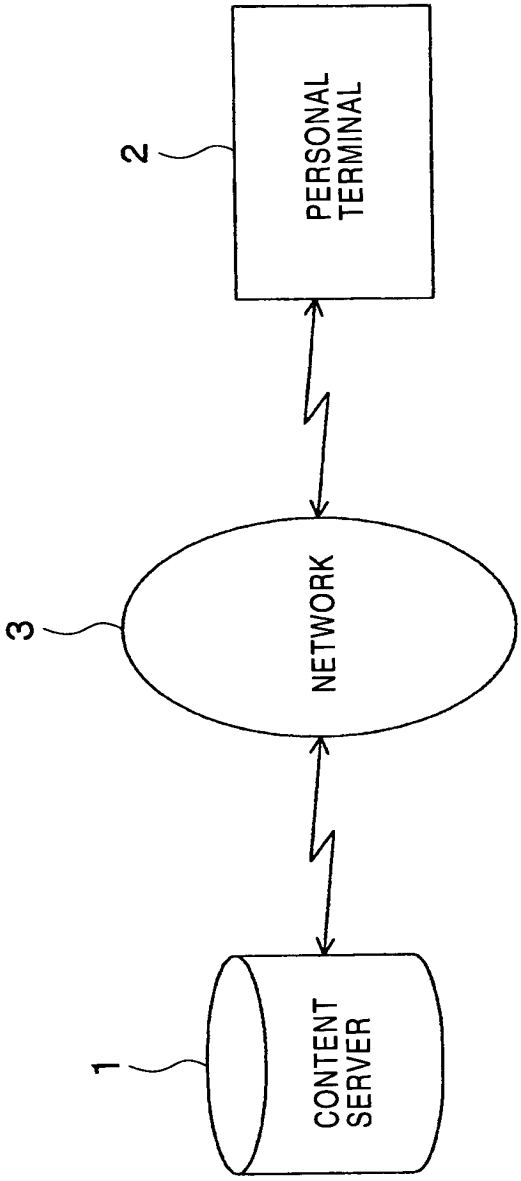

FIG. 2

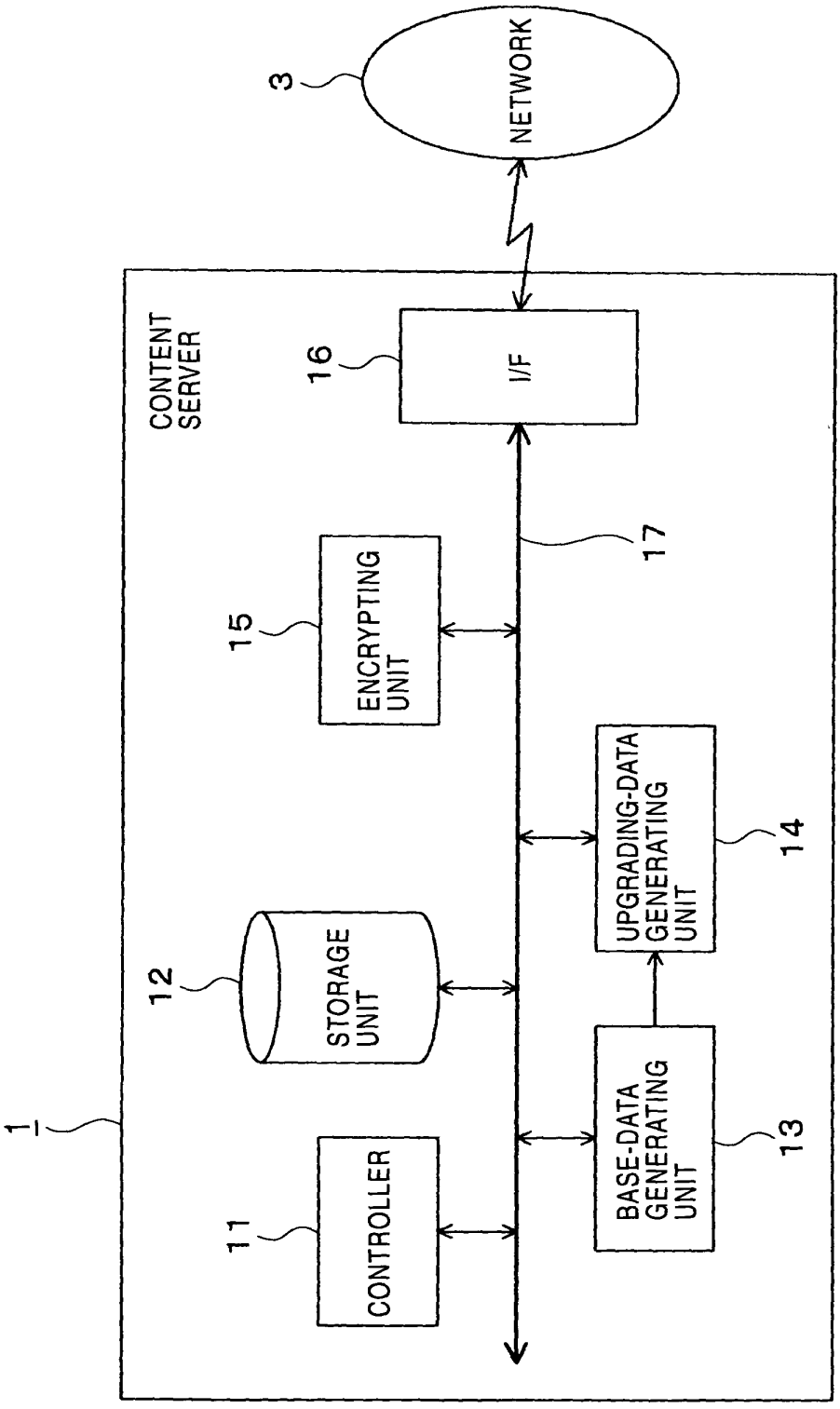
3
NETWORK
CONTENT SERVER
16
I/F
17
15
ENCRYPTING UNIT
UPGRADING-DATA GENERATING UNIT
14
12
STORAGE UNIT
BASE-DATA GENERATING UNIT
13
11
CONTROLLER
1

FIG. 3

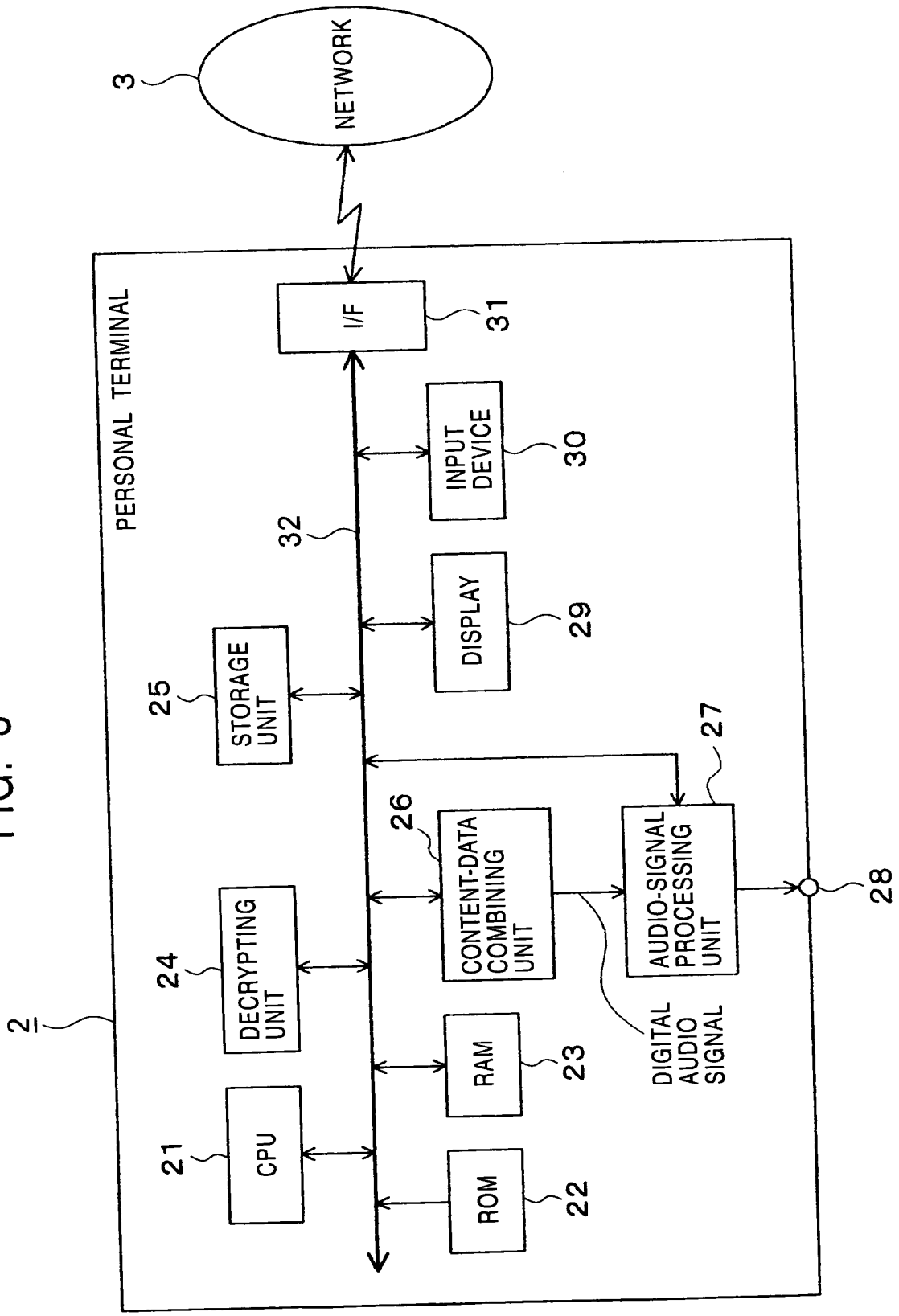
NETWORK
3
PERSONAL TERMINAL
2
I/F
31
INPUT DEVICE
30
DISPLAY
29
STORAGE UNIT
25
DECRYPTING UNIT
24
CPU
21
RAM
23
ROM
22
CONTENT-DATA COMBINING UNIT
26
AUDIO-SIGNAL PROCESSING UNIT
27
28
DIGITAL AUDIO SIGNAL
32

FIG. 4

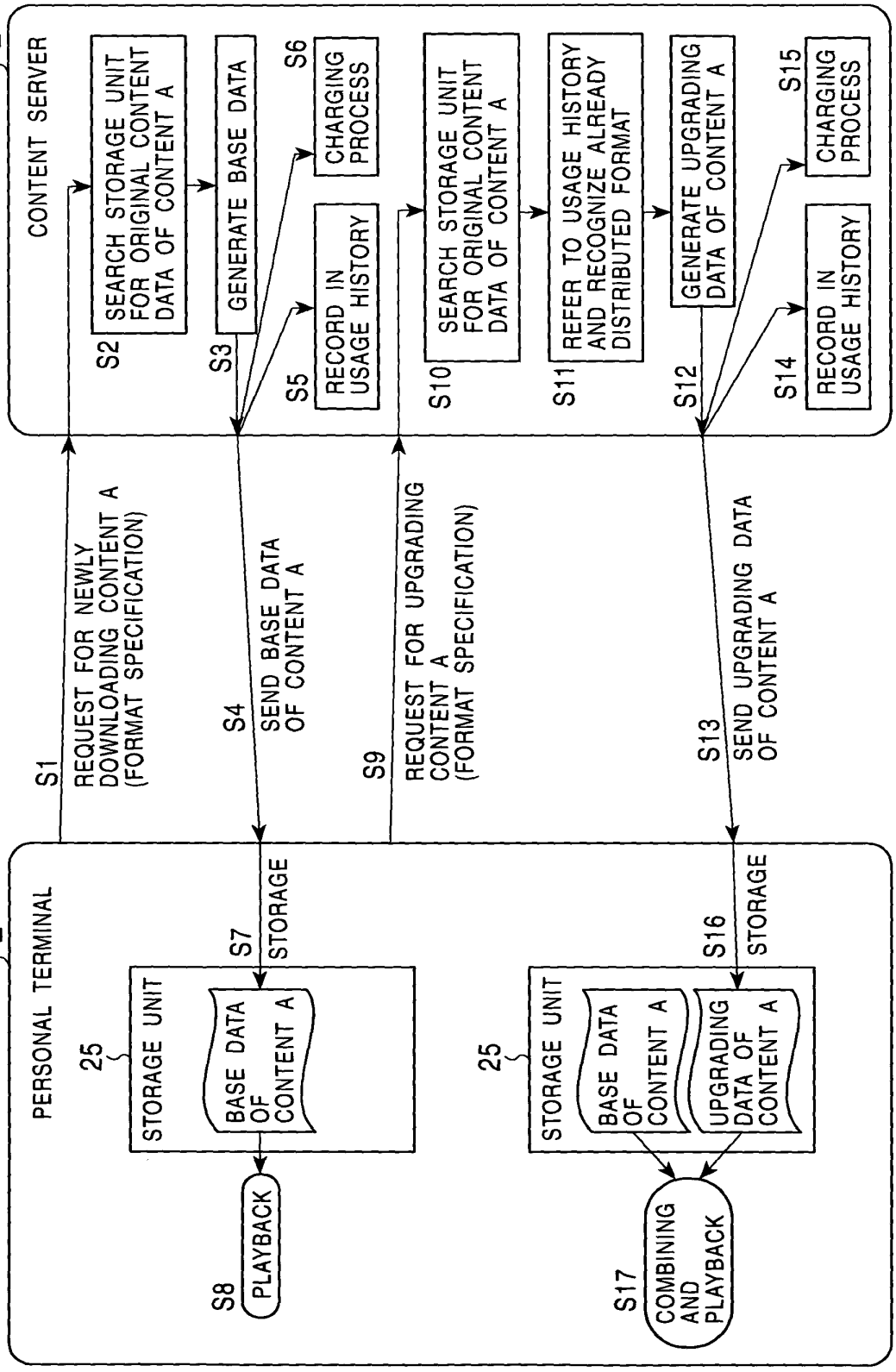
1
CONTENT SERVER
S2
SEARCH STORAGE UNIT FOR ORIGINAL CONTENT DATA OF CONTENT A
S3
GENERATE BASE DATA
S5
RECORD IN USAGE HISTORY
S6
CHARGING PROCESS
S10
SEARCH STORAGE UNIT FOR ORIGINAL CONTENT DATA OF CONTENT A
S11
REFER TO USAGE HISTORY AND RECOGNIZE ALREADY DISTRIBUTED FORMAT
S12
GENERATE UPGRADING DATA OF CONTENT A
S14
RECORD IN USAGE HISTORY
S15
CHARGING PROCESS
S1
REQUEST FOR NEWLY DOWNLOADING CONTENT A (FORMAT SPECIFICATION)
S4
SEND BASE DATA OF CONTENT A
S9
REQUEST FOR UPGRADING CONTENT A (FORMAT SPECIFICATION)
S13
SEND UPGRADING DATA OF CONTENT A
2
PERSONAL TERMINAL
25
STORAGE UNIT
BASE DATA OF CONTENT A
S7
STORAGE
S8
PLAYBACK
25
STORAGE UNIT
BASE DATA OF CONTENT A
UPGRADING DATA OF CONTENT A
S16
STORAGE
S17
COMBINING AND PLAYBACK

FIG. 5

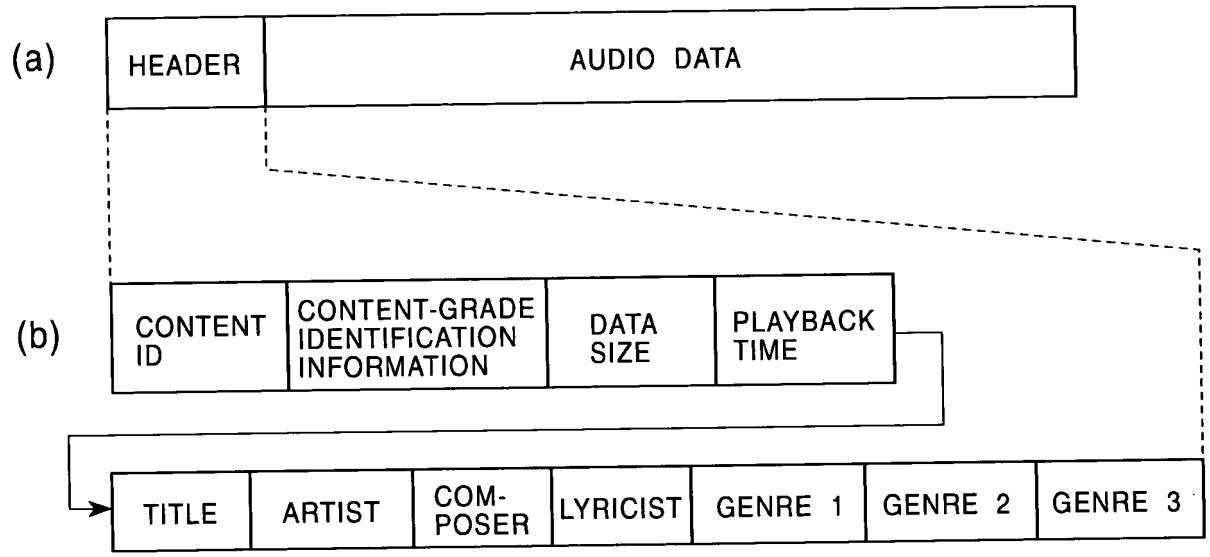
(a)
HEADER
AUDIO DATA
(b)
CONTENT ID
CONTENT-GRADE IDENTIFICATION INFORMATION
DATA SIZE
PLAYBACK TIME
TITLE
ARTIST
COM-POSER
LYRICIST
GENRE 1
GENRE 2
GENRE 3

FIG. 6

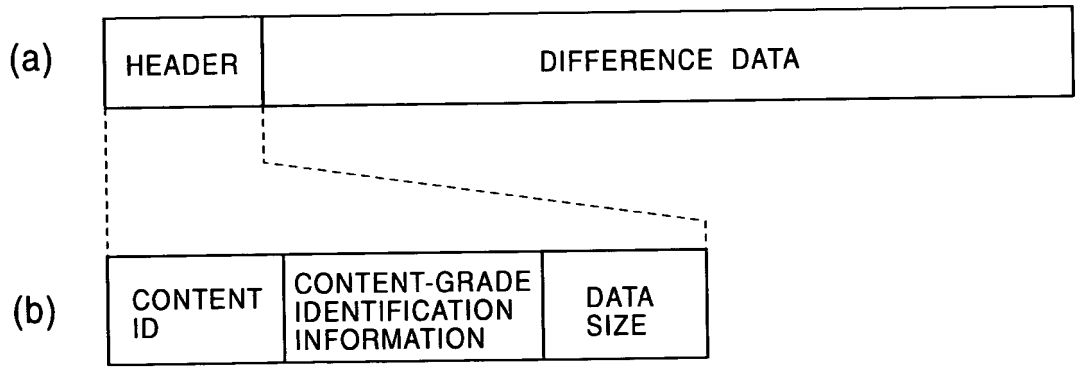
(a)
HEADER
DIFFERENCE DATA
(b)
CONTENT ID
CONTENT-GRADE IDENTIFICATION INFORMATION
DATA SIZE

FIG. 7

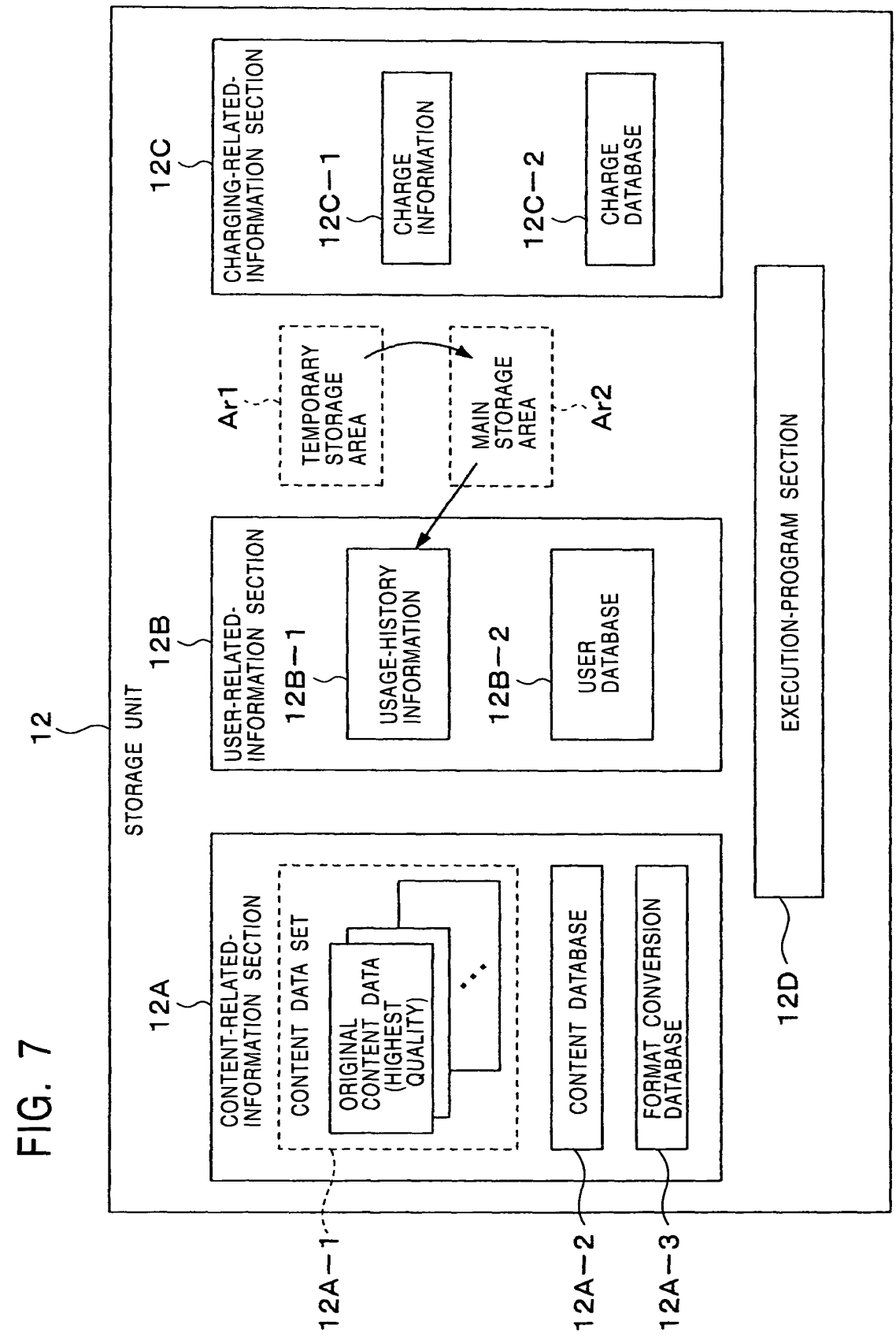
12
STORAGE UNIT
12A
CONTENT-RELATED-INFORMATION SECTION
CONTENT DATA SET
ORIGINAL CONTENT DATA (HIGHEST QUALITY)
...
12A-1
CONTENT DATABASE
12A-2
FORMAT CONVERSION DATABASE
12A-3
12B
USER-RELATED-INFORMATION SECTION
12B-1
USAGE-HISTORY INFORMATION
12B-2
USER DATABASE
Ar1
TEMPORARY STORAGE AREA
MAIN STORAGE AREA
Ar2
12C
CHARGING-RELATED-INFORMATION SECTION
12C-1
CHARGE INFORMATION
12C-2
CHARGE DATABASE
12D
EXECUTION-PROGRAM SECTION

FIG. 8

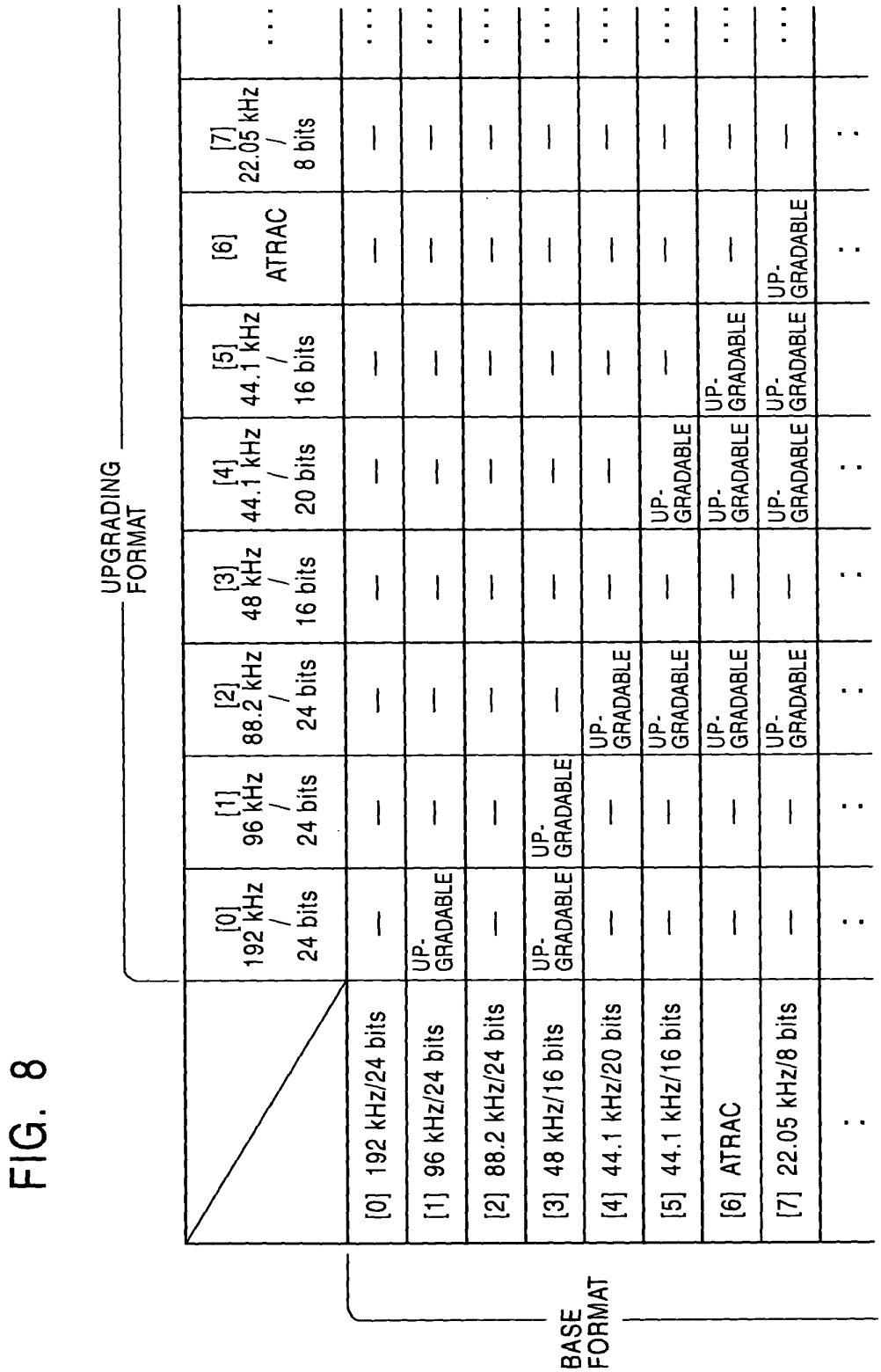
UPGRADING FORMAT
BASE FORMAT
[0] 192 kHz / 24 bits
[1] 96 kHz / 24 bits
[2] 88.2 kHz / 24 bits
[3] 48 kHz / 16 bits
[4] 44.1 kHz / 20 bits
[5] 44.1 kHz / 16 bits
[6] ATRAC
[7] 22.05 kHz / 8 bits
[0] 192 kHz/24 bits
[1] 96 kHz/24 bits
[2] 88.2 kHz/24 bits
[3] 48 kHz/16 bits
[4] 44.1 kHz/20 bits
[5] 44.1 kHz/16 bits
[6] ATRAC
[7] 22.05 kHz/8 bits
—
UP-GRADABLE

FIG. 9

FORMAT NUMBER	FORMAT
0	192 kHz/24 bits
1	96 kHz/24 bits
2	88.2 kHz/24 bits
3	48 kHz/16 bits
4	44.1 kHz/20 bits
5	44.1 kHz/16 bits
6	ATRAC
7	22.05 kHz/8 bits
⋮	⋮

FIG. 10

UPGRADING TYPE	BASE FORMAT	UPGRADING FORMAT
1–0	96 kHz/24 bits	192 kHz/24 bits
3–0	48 kHz/16 bits	192 kHz/24 bits
3–1	48 kHz/16 bits	96 kHz/24 bits
4–2	44.1 kHz/20 bits	88.2 kHz/24 bits
5–2	44.1 kHz/16 bits	88.2kHz/24 bits
5–4	44.4 kHz/16 bits	44.1 kHz/20 bits
6–2	ATRAC	88.2 kHz/24 bits
6–4	ATRAC	44.1 kHz/20 bits
6–5	ATRAC	44.1 kHz/16 bits
7–2	22.05 kHz/8 bits	88.2 kHz/24 bits
7–4	22.05 kHz/8 bits	44.1 kHz/20 bits
7–5	22.05 kHz/8 bits	44.1 kHz/16 bits
7–6	22.05 kHz/8 bits	ATRAC
⋮	⋮	⋮

FIG. 11

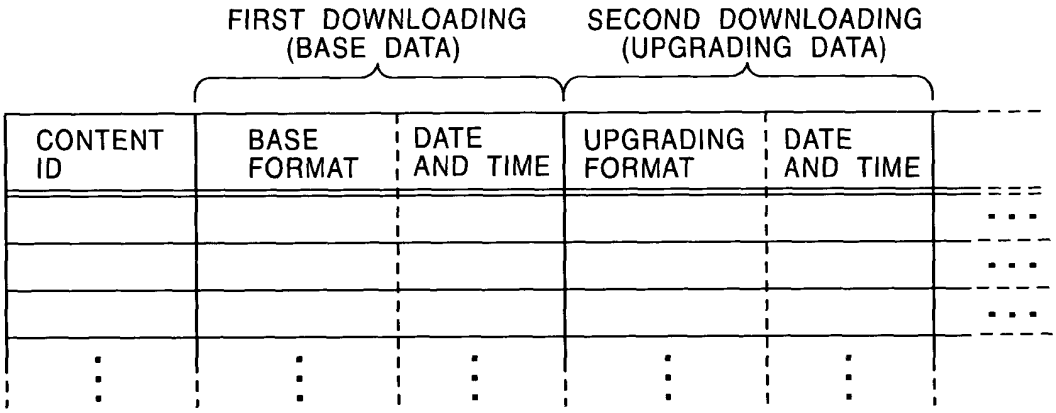

FIG. 12

USER ID	PASSWORD	HISTORY-INFORMATION POINTER	MOST USED GENRE	MONTHLY SERVICE CHARGE
⋮	⋮	⋮	⋮	⋮

FIG. 13

CONTENT ID	SERVICE CHARGE (192 kHz/24 bits)	SERVICE CHARGE (96 kHz/24 bits)
⋮	⋮	⋮

FIG. 14

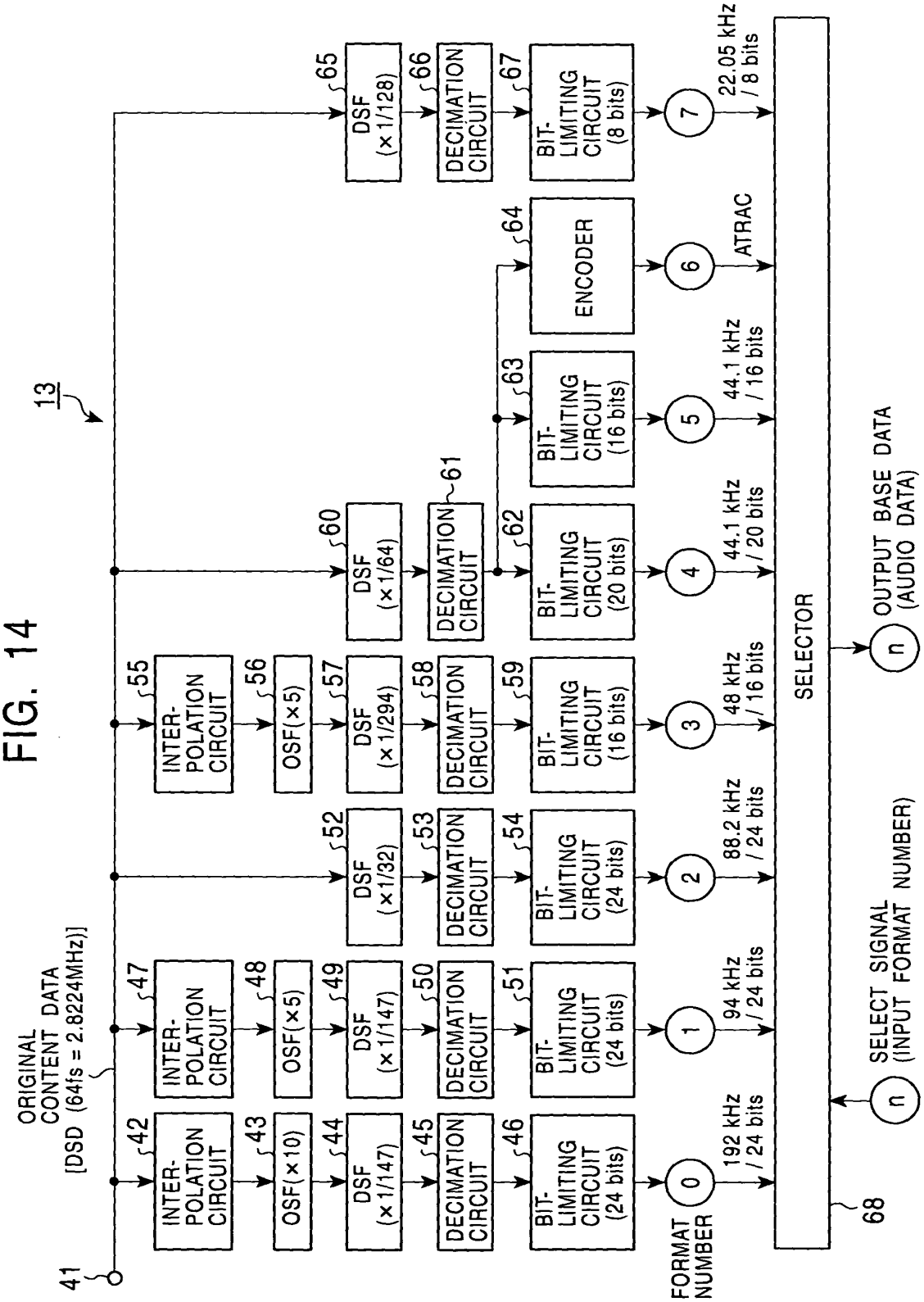
13
41
ORIGINAL CONTENT DATA [DSD (64fs = 2.8224MHz)]
INTER-POLATION CIRCUIT
OSF(×10)
DSF (×1/147)
DECIMATION CIRCUIT
BIT-LIMITING CIRCUIT (24 bits)
INTER-POLATION CIRCUIT
OSF(×5)
DSF (×1/147)
DECIMATION CIRCUIT
BIT-LIMITING CIRCUIT (24 bits)
DSF (×1/32)
DECIMATION CIRCUIT
BIT-LIMITING CIRCUIT (24 bits)
INTER-POLATION CIRCUIT
OSF(×5)
DSF (×1/294)
DECIMATION CIRCUIT
BIT-LIMITING CIRCUIT (16 bits)
DSF (×1/64)
DECIMATION CIRCUIT
BIT-LIMITING CIRCUIT (20 bits)
BIT-LIMITING CIRCUIT (16 bits)
ENCODER
DSF (×1/128)
DECIMATION CIRCUIT
BIT-LIMITING CIRCUIT (8 bits)
FORMAT NUMBER
192 kHz / 24 bits
94 kHz / 24 bits
88.2 kHz / 24 bits
48 kHz / 16 bits
44.1 kHz / 20 bits
44.1 kHz / 16 bits
ATRAC
22.05 kHz / 8 bits
SELECTOR
68
SELECT SIGNAL (INPUT FORMAT NUMBER)
OUTPUT BASE DATA (AUDIO DATA)

FIG. 15

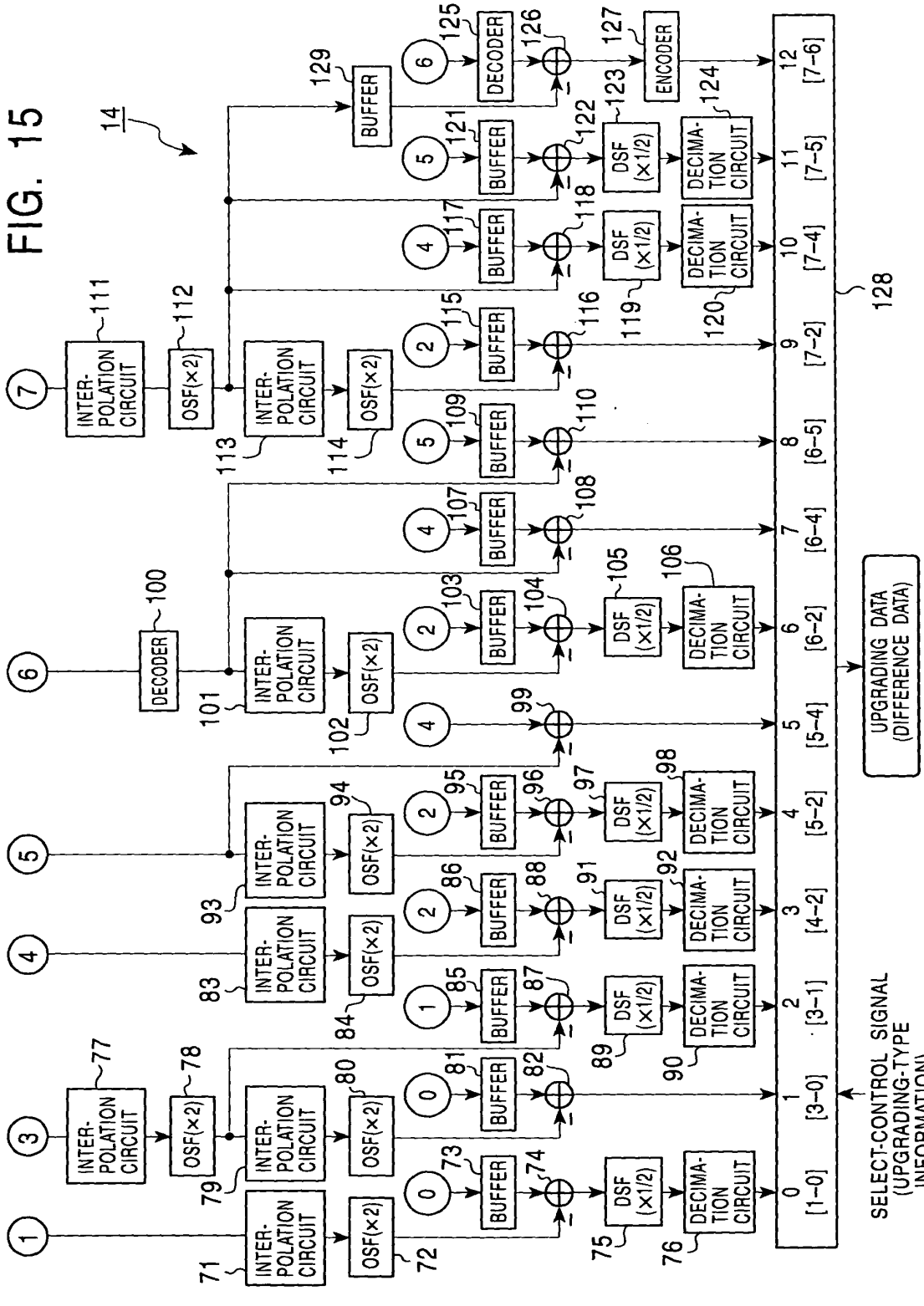
14
INTER-POLATION CIRCUIT
OSF(×2)
DECODER
BUFFER
DSF (×1/2)
DECIMATION CIRCUIT
ENCODER
SELECT-CONTROL SIGNAL (UPGRADING-TYPE INFORMATION)
UPGRADING DATA (DIFFERENCE DATA)

FIG. 16

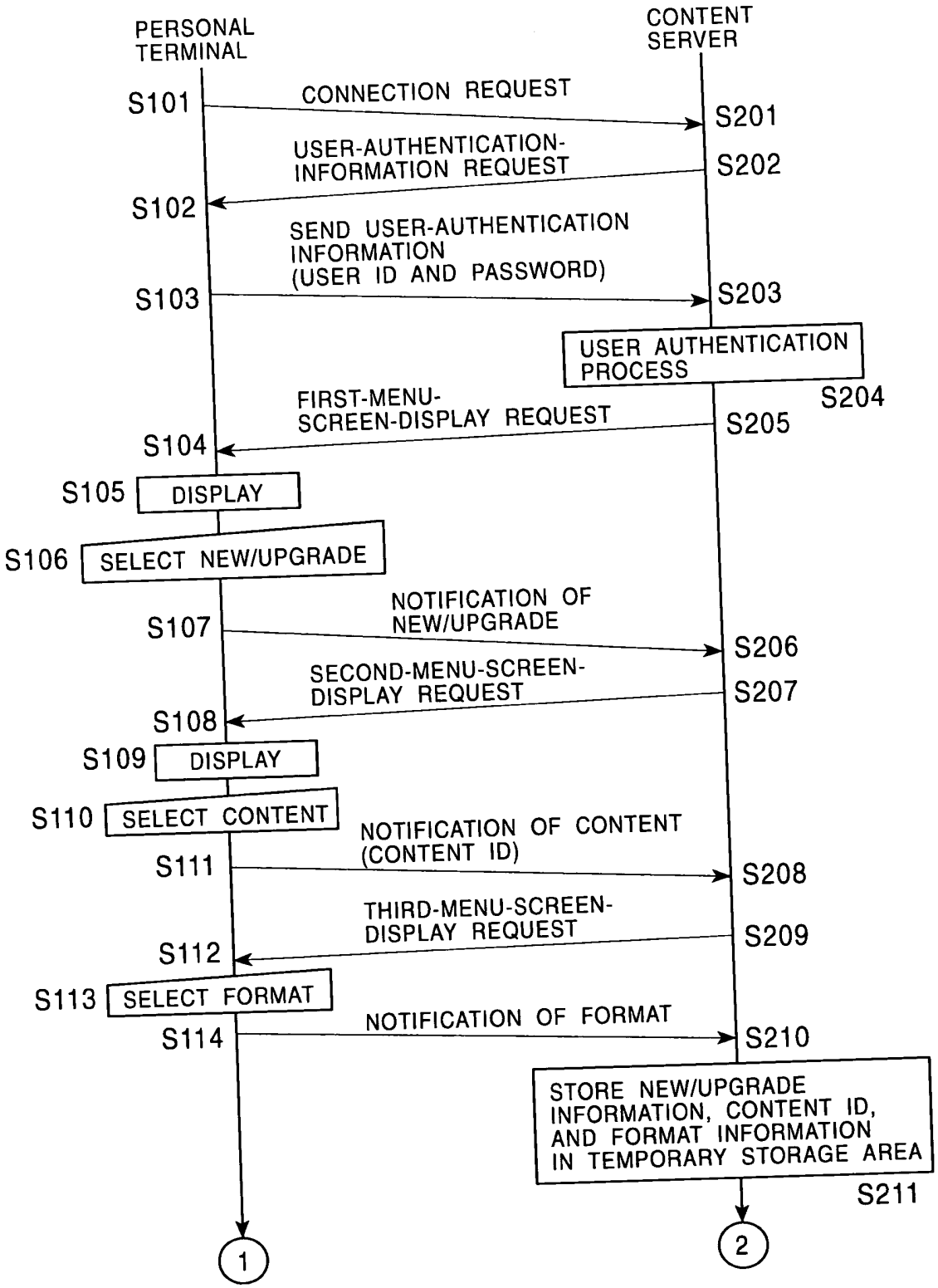
PERSONAL TERMINAL
CONTENT SERVER
S101
CONNECTION REQUEST
S201
USER-AUTHENTICATION-INFORMATION REQUEST
S202
S102
SEND USER-AUTHENTICATION INFORMATION (USER ID AND PASSWORD)
S103
S203
USER AUTHENTICATION PROCESS
S204
FIRST-MENU-SCREEN-DISPLAY REQUEST
S205
S104
S105
DISPLAY
S106
SELECT NEW/UPGRADE
NOTIFICATION OF NEW/UPGRADE
S107
S206
SECOND-MENU-SCREEN-DISPLAY REQUEST
S207
S108
S109
DISPLAY
S110
SELECT CONTENT
NOTIFICATION OF CONTENT (CONTENT ID)
S111
S208
THIRD-MENU-SCREEN-DISPLAY REQUEST
S209
S112
S113
SELECT FORMAT
NOTIFICATION OF FORMAT
S114
S210
STORE NEW/UPGRADE INFORMATION, CONTENT ID, AND FORMAT INFORMATION IN TEMPORARY STORAGE AREA
S211
1
2

FIG. 17

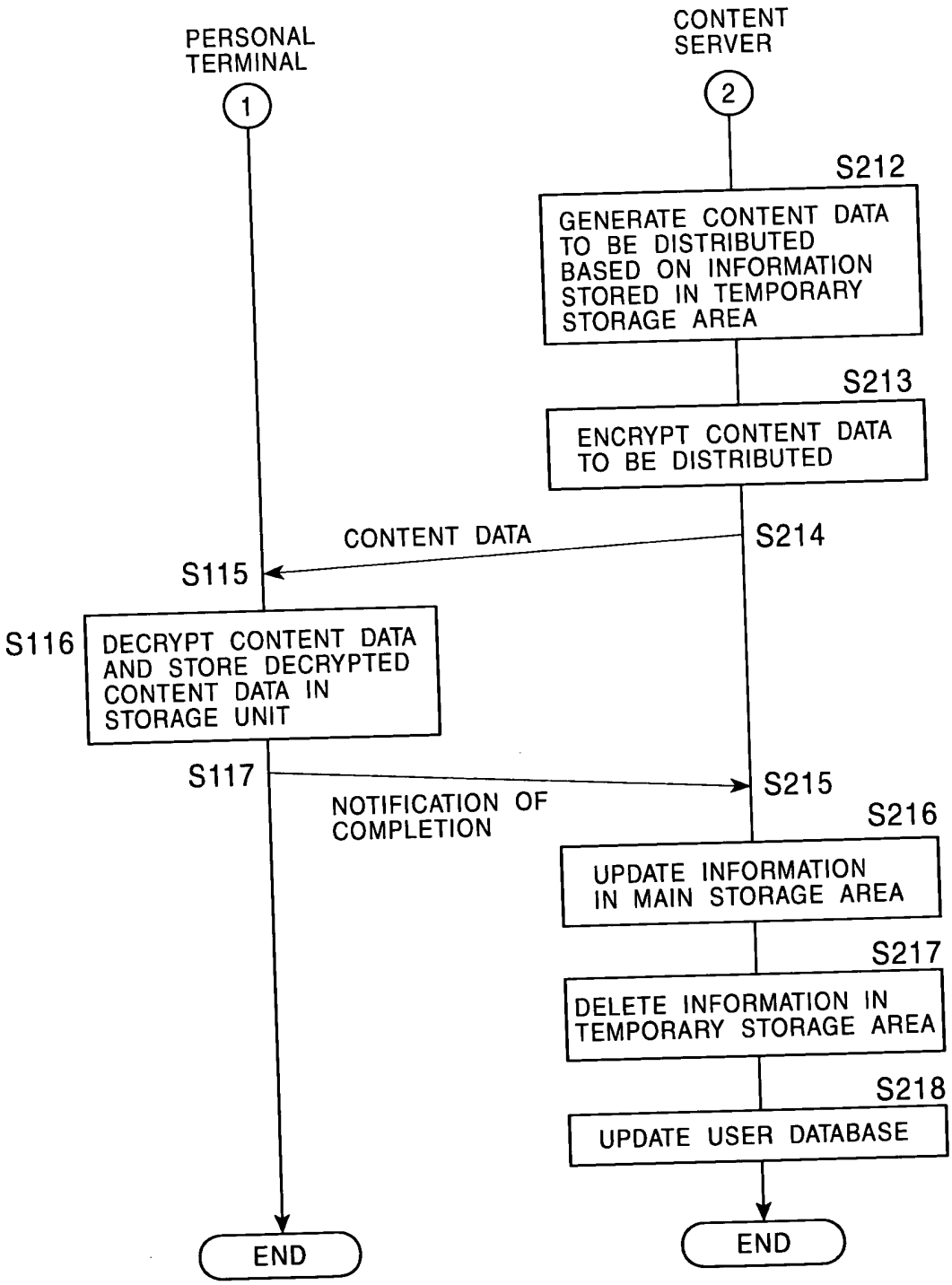
PERSONAL TERMINAL
CONTENT SERVER
1
2
S212
GENERATE CONTENT DATA TO BE DISTRIBUTED BASED ON INFORMATION STORED IN TEMPORARY STORAGE AREA
S213
ENCRYPT CONTENT DATA TO BE DISTRIBUTED
CONTENT DATA
S214
S115
S116
DECRYPT CONTENT DATA AND STORE DECRYPTED CONTENT DATA IN STORAGE UNIT
S117
NOTIFICATION OF COMPLETION
S215
S216
UPDATE INFORMATION IN MAIN STORAGE AREA
S217
DELETE INFORMATION IN TEMPORARY STORAGE AREA
S218
UPDATE USER DATABASE
END
END

FIG. 18

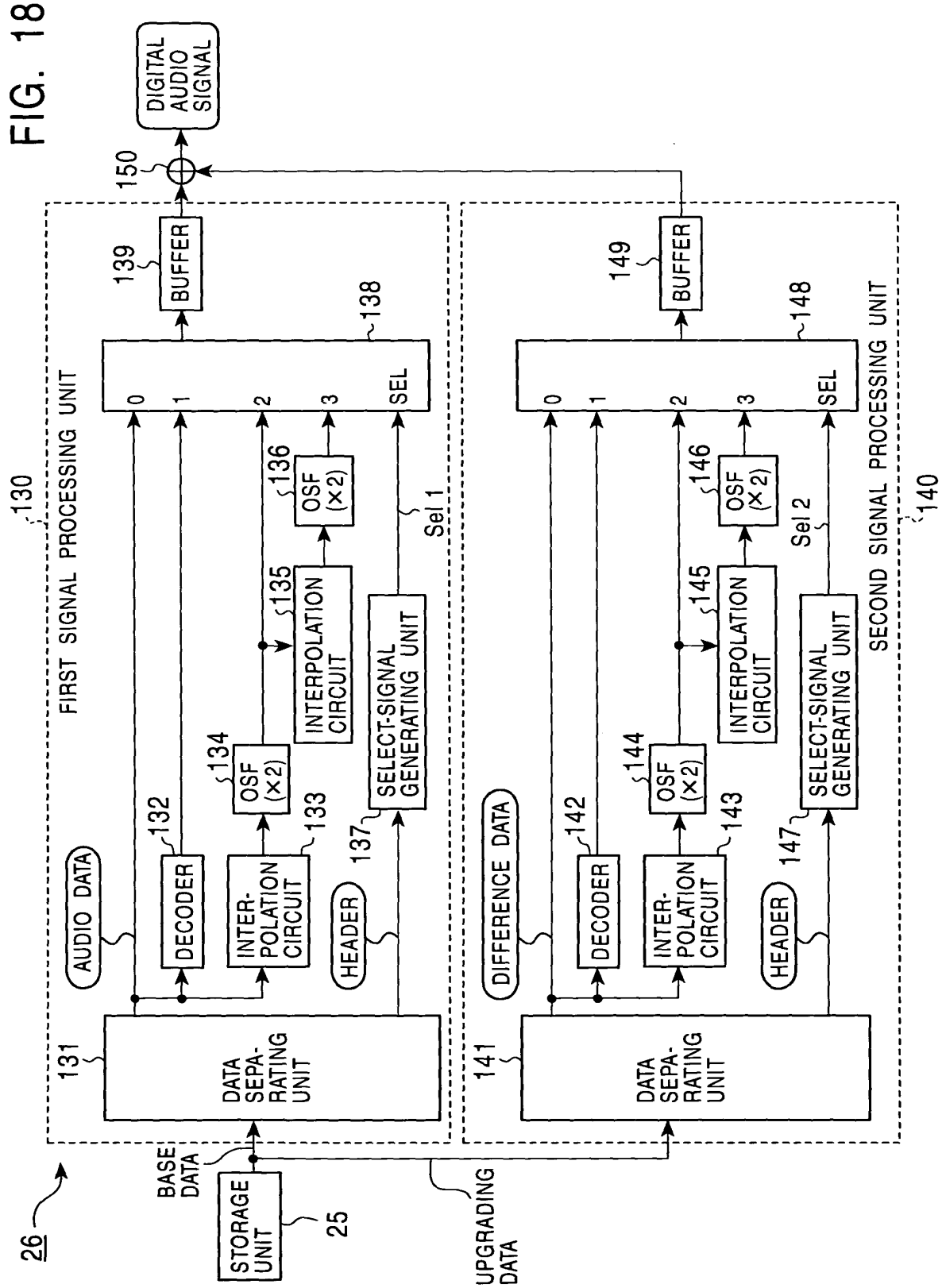
26
STORAGE UNIT
25
BASE DATA
UPGRADING DATA
130
FIRST SIGNAL PROCESSING UNIT
131
DATA SEPA-RATING UNIT
AUDIO DATA
DECODER
132
INTER-POLATION CIRCUIT
133
OSF (×2)
134
INTERPOLATION CIRCUIT
135
OSF (×2)
136
HEADER
137
SELECT-SIGNAL GENERATING UNIT
Sel 1
0
1
2
3
SEL
138
BUFFER
139
150
DIGITAL AUDIO SIGNAL
140
SECOND SIGNAL PROCESSING UNIT
141
DATA SEPA-RATING UNIT
DIFFERENCE DATA
DECODER
142
INTER-POLATION CIRCUIT
143
OSF (×2)
144
INTERPOLATION CIRCUIT
145
OSF (×2)
146
HEADER
147
SELECT-SIGNAL GENERATING UNIT
Sel 2
0
1
2
3
SEL
148
BUFFER
149

FIG. 19

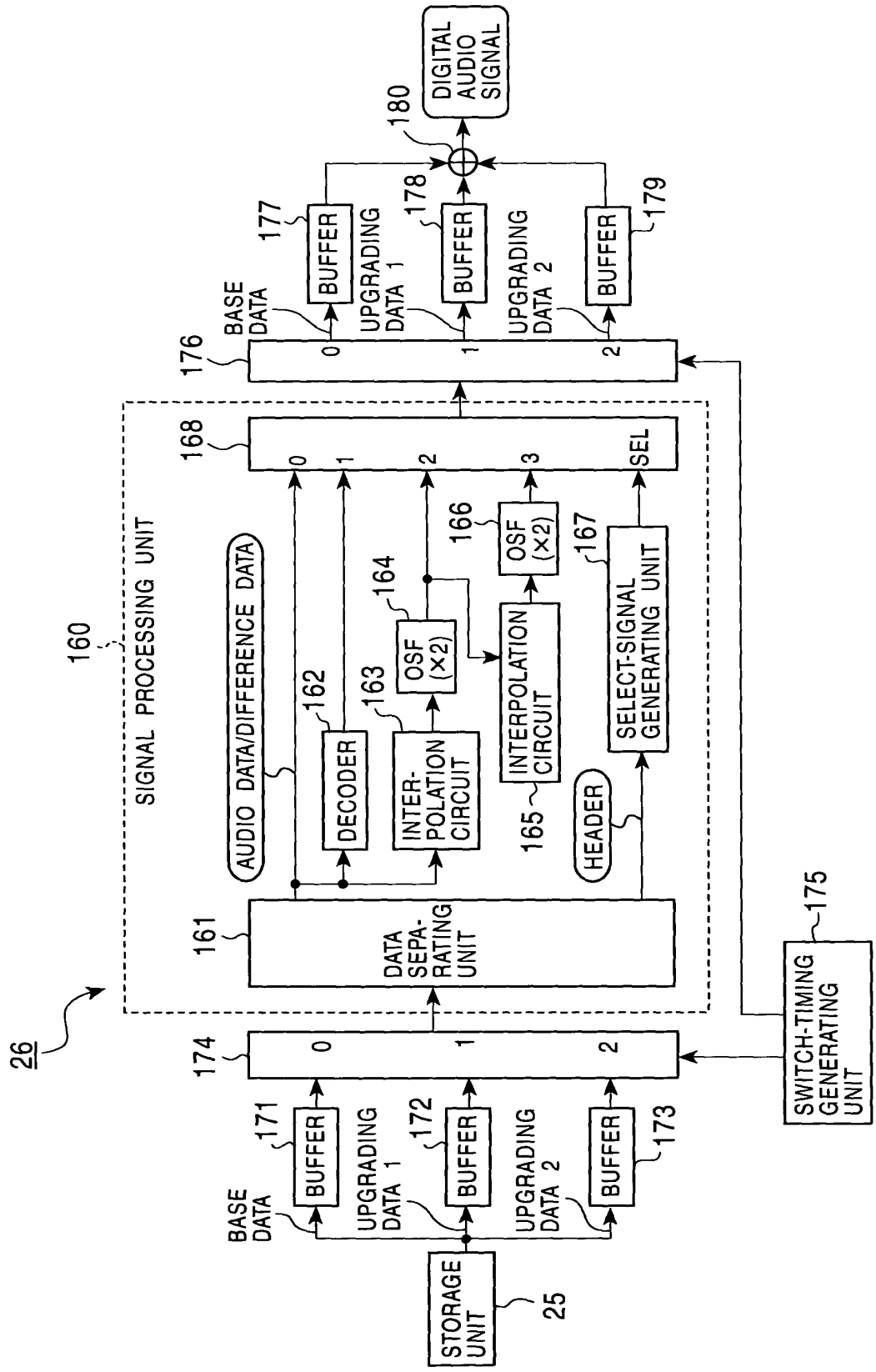
26
160
SIGNAL PROCESSING UNIT
STORAGE UNIT
25
BASE DATA
UPGRADING DATA 1
UPGRADING DATA 2
171
172
173
BUFFER
174
0
1
2
DATA SEPA-RATING UNIT
161
AUDIO DATA/DIFFERENCE DATA
HEADER
DECODER
162
INTER-POLATION CIRCUIT
163
OSF (×2)
164
INTERPOLATION CIRCUIT
165
OSF (×2)
166
SELECT-SIGNAL GENERATING UNIT
167
168
SEL
3
SWITCH-TIMING GENERATING UNIT
175
176
177
178
179
180
DIGITAL AUDIO SIGNAL

FIG. 20

CONTENT GRADE		SELECT-SIGNAL OUTPUT	
		Sel 1	Sel 2
FORMAT NUMBER	0	0	—
	1	0	—
	2	0	—
	3	0	—
	4	0	—
	5	0	—
	6	1	—
	7	0	—
UP-GRADING TYPE	1 – 0	0	2
	3 – 0	3	0
	3 – 1	0	2
	4 – 2	0	2
	5 – 2	0	2
	5 – 4	0	0
	6 – 2	1	2
	6 – 4	1	0
	6 – 5	1	0
	7 – 2	3	0
	7 – 4	0	2
	7 – 5	0	2
	7 – 6	0	1
	:	:	: